IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant:	D'Elia et al.	Examiner:	Peralta, G.
Serial No.:	09/575,349	Group Art Unit:	2814
Filed:	May 19, 2000	Docket No.:	AMDA.474PA
Title:	CVD GAS INJECTOR AND METHOD THEREFOR		

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence and the papers, as described hereinabove, are being deposited in the United States Postal Service **in triplicate**, as first class mail, in an envelope addressed to: Mail Stop Appeal Brief – Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on December 5, 2003.

By: Erin M. Nichols
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APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Appeal Brief submitted pursuant to 37 C.F.R. § 1.192 for the above-referenced patent application. Please charge Deposit Account 01-0365 (TT4037) in the amount of $330 for this brief in support of appeal as indicated in 37 C.F.R. § 1.17(c). If necessary, authority is given to charge/credit Deposit Account 01-0365 (TT4037) any additional fees/overages in support of this filing.

Enclosed please find a Petition for Extension of Time.

I. Real Party in Interest

The real party in interest is Advanced Micro Devices, Inc., having a place of business at One AMD Place, P.O. Box 3453, Sunnyvale, California. The above referenced patent application is assigned to Advanced Micro Devices, Inc.

II. Related Appeals and Interferences

There are no related appeals or interferences.

III. Status of Claims

Claims 18-30 are presented for appeal. Claims 18-21, 26 and 27 stand rejected under 35 U.S.C. § 102(b) over *Okumura et al.* (U.S. Patent No. 5,015,330); claims 22-25 stand rejected under 35 U.S.C. § 103(a) over *Okumura et al.* in view of *Jeng et al.* (U.S. Patent No. 5,710,073); and claims 28-30 stand rejected under 35 U.S.C. § 103(a) over *Okumura et al.* in view of *Bartholomew et al.* (U.S. Patent No. 6,143,080). The pending claims presented for appeal may be found in the attached Appendix of Appealed Claims.

IV. Status of Amendments

The application was initially filed on May 19, 2000, including claims 1-30. In reply to a first Office Action mailed September 26, 2001, including a Restriction Requirement, an Office Action Response was filed on October 8, 2001, *inter alia*, electing Group II claims (claims 19-30). A second Office Action withdrawing claims 1-17 from further consideration, but permitting linking claim 18 to be examined with the elected invention, was mailed January 16, 2002. An Office Action Response was filed in reply on April 16, 2002. On July 16, 2002 a final Office Action was mailed, and in reply an Office Action Response was filed on September 11, 2002 by facsimile. An Advisory Action was mailed on October 8, 2002 maintaining the final rejections, and a Notice of Appeal was filed on October 15, 2002. An Appeal Brief was filed on November 18, 2002 and in reply, prosecution was reopened with the mailing of an Office Action on February 3, 2003. An Office Action Response was filed on April 23, 2003 including, *inter alia*, an amendment to claim 18. A final Office Action was mailed on June 24, 2003 and an Office Action Response and Amendment was filed on July 31, 2003 including, *inter alia*, an amendment to claims 18 and 19. The July 31st Response was resubmitted to the USPTO on September 24, 2003 in connection with the filing of a Notice of Appeal that same day. An Advisory Action was mailed on October 22, 2003 indicating that the amendments to claims 18 and 19 filed on July 31, 2003 were not entered.

V. Summary of Invention

One embodiment of Appellant's invention is directed to a method for forming a uniformly thick coating on the surface of a semiconductor wafer (220) in a CVD arrangement (200). In order to achieve a uniformly thick coating, gas is supplied via injector means (210) to the wafer surface located in a zone of the CVD arrangement that would exhibit a depleted gas supply if the injector means was not present. One example of such a zone includes a wafer located near the CVD arrangement's exhaust (235) where a wafer would exhibit different properties and variations compared to a wafer located away from the exhaust due to a decreased reactant concentration in the gas and decreased gas residence times. One way in which a uniform gas supply is obtained involves the injector means including outlet holes (215) facing away from respectively associated wafers such that the gas exits the injector means toward the reactor tube wall. The reactor tube wall helps disperse the injected gas uniformly over the wafer surface by preventing a direct blast of gas at the wafer. The supplied, *e.g.*, injected, gas is then used in combination with selected reactants to deposit a coating on the wafer.

Other embodiments include an anti-reflective coating having a k value of refractive index between 0.6 and 0.8, adjusting the gas injector to maintain a uniform gas supply, including a gas concentration detector, removing the gas concentration detector prior to depositing the coating, and detecting the concentration of the supplied gas while operating the CVD arrangement under simulated processing conditions.

VI. Issues for Review

Issue 1: Is the Section 102(b) rejection of claim groups I and III proper when the asserted reference (*Okumura et al.* '330) fails to correspond to, and teaches the opposite of, the claimed invention?

Issue 2: Is the Section 102(b) rejection of claim groups I and III proper when the asserted '330 reference fails to correspond to Appellant's claimed structure and function?

Issue 3: Is the Section 102(b) rejection of claim groups I and III proper when the Examiner fails to identify elements of the asserted '330 reference that would allegedly correspond to Appellant's claim limitations including, *e.g.*, the wafer

surface and the specified zone as used in the claim 18 clause, "the surface being in a zone of the CVD arrangement that exhibits a depleted gas supply absent the injector means"?

Issue 4: Is the Section 103(a) rejection of claim group II proper when the Examiner fails to present evidence of motivation for the asserted combination of references ('330 reference in view of *Jeng et al.* '073) and fails to present a *prima facie* Section 103(a) rejection?

Issue 5: Is the Section 103(a) rejection of claim groups IV-VI proper when the asserted combination of references ('330 reference in view of *Bartholomew et al.* '080) fails to correspond to each of the claimed limitations?

VII. Grouping of Claims

For purposes of this appeal, claims 18-21 and 26 are in group I, claims 22-25 are in group II, claim 27 is in group III, claim 28 is in group IV, claim 29 is in group V, and claim 30 is in group VI. The claims as now presented do not stand or fall together.

VIII. Argument

The claims in group I are separately patentable over the prior art because they are directed to subject matter that includes supplying gas to the surface of a wafer in a zone of a CVD arrangement that exhibits a depleted gas supply absent an injector, which is not taught by the prior art. Claims 22-25 in group II are separately patentable over the prior art and the other claim groups because they are directed to subject matter that includes using ammonia and dicholorosilane, depositing an anti-reflective coating having a k value of refractive index that is between about 0.6 and 0.8, and using the anti-reflective coating to perform photolithography, which is not necessarily present in the other claim groups and not taught by the cited prior art. Claim 27 in group III is separately patentable over the prior art and the other claim groups because it is directed to subject matter that includes adjusting a gas injector to maintain a uniform gas supply, which is not necessarily present in the other claim groups and not taught by the cited prior art. Claim 28 in group IV is separately patentable over the prior art and the other claim groups because it is directed to subject matter that includes providing at least one gas concentration detector in the CVD arrangement and

detecting the concentration of the supplied gas using the detector, which is not necessarily present in the other claim groups and not taught by the cited prior art. Claim 29 in group V is separately patentable over the prior art and the other claim groups because it is directed to subject matter that includes removing the at least one gas concentration detector from the CVD arrangement after detecting the concentration of the supplied gas, which is not necessarily present in the other claim groups and not taught by the cited prior art. Claim 30 in group VI is separately patentable over the prior art and the other claim groups because it is directed to subject matter that includes operating the CVD arrangement under simulated processing conditions, which is not necessarily present in the other claim groups and not taught by the cited prior art.

Issue 1: The Section 102(b) rejection of claim groups I and III is improper when the asserted reference (*Okumura et al.* '330) fails to correspond to, and teaches the opposite of, the claimed invention.

The '330 reference fails to teach each of the claimed limitations including limitations directed to the claimed structure and function for supplying a uniform supply of gas to the surface of the wafer. Appellant's invention is directed to a gas injection approach in which the vertical arm of the injector indirectly injects gas through outlet holes, with the holes being directed away from the respectively-situated wafers and toward the surrounding reactor tube wall which, in turn, carries the gas in an even flow toward all sides of each wafer so that the gas is dispersed uniformly in the wafer zone from the reactor wall. Appellant's disclosure includes other configurations wherein the gas outlet is directed away from each of the wafers for uniformly supplying gas to each wafer's surface.

In contrast to this issue of unevenness in gas distribution at the surface of a given wafer in a particular zone, the '330 reference addresses an unevenness in gas density as gas or plasma is applied to vertically displaced wafers. With respect to any given wafer surface, the '330 reference teaches that gas is to be injected directly at the wafer with the resultant unevenness at the wafer surface being ignored. Appellant submits that the '330 reference cannot be aligned with the claim limitations directed to supplying a uniform supply of gas to the surface of a wafer, and that the Examiner is confusing the '330 reference's issue of gas-density unevenness between vertically displaced wafers with Appellant's issue of evenness

across the surface of the wafer. As addressed further below, the Examiner's assertions are ungrounded because they ignore the claim limitations and gloss over teachings of the '330 reference that specifically contradict any such alleged correspondence to the claimed invention.

The '330 reference explicitly acknowledges that its wafer-directed-gas injection approach does not distribute gas uniformly to the wafers. Referring to figure 8 of the '330 reference, gas outlet tube 92 injects gas directly at the wafers 85, as indicated by the direction of the arrows extending from gas discharge holes 92a (extending from outlet tube 92). At page 2 of the final Office Action (dated June 24, 2003), the Examiner erroneously asserts that the figure 8 embodiment of the '330 reference distributes the injected gas uniformly to the surface of a wafer. In support of this assertion, the Examiner fails to cite any specific text from the '330 reference. The text describing this figure 8 embodiment of the '330 reference (the embodiment relied upon by the Examiner) explains that the injector gas is distributed "uniformly" between the wafers in the context of the gas being distributed vertically so that a wafer at the top of the chamber does not experience a gas pressure greater than a wafer at the bottom of the chamber.

At column 10, the '330 reference teaches that the reaction chamber 81 of figure 8 uses specially formed discharge holes in the gas outlet tube 92 to address a lack of uniform gas density at the upper portion of the chamber relative to the lower portion of the chamber (see column 10, lines 24-26). In connection with this figure 8 embodiment, the '330 reference does not discuss providing a uniform gas at the surface of any wafer, nor does the '330 reference recognize this lack of uniformity being an issue. In this regard, it should be appreciated that lack of uniform gas density at the upper portion relative to the lower portion of the chamber is unrelated to the lack of uniform gas distribution horizontally along the surfaces of the wafer.

While not relied upon in connection with the final rejection, the gas distribution density issue addressed by the '330 reference is better appreciated by referring to the related embodiment of figure 1. At column 6, lines 7-10, the '330 reference acknowledges that its wafer-directed-gas injection approach (of both the figure 1 and figure 8 embodiments) results in an unevenness in and between the surfaces of the wafers. Later in this same discussion,

the '330 reference explains that the vertical unevenness of the gas density is "caused by the difference in vertical positions of the wafers" (column 6, lines 33-38).

In the Examiner's response to Appellant's arguments (not relied upon in the final Office Action rejections), the Examiner improperly cites the figure 1 embodiment described at column 6 in conjunction with the different embodiment of figure 8, with no explanation of how these different embodiments are being combined, how the skilled artisan would be led to combine these different embodiments, or how these combined embodiments would be used.[1] If relied upon in a forthcoming rejection, such intermingling of embodiments is inappropriate when there is no teaching within the embodiments that they may be combined. For a Section 102 rejection to be maintained, the identical invention must be disclosed in the same arrangement as taught by the claim under examination. See, *Richardson v. Suzuki Motor Co., Ltd.*, 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989), *cert. denied*, 493 U.S. 853 (1989); *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990); and MPEP § 2131.

With particular respect to claim 27 of group III, the Examiner again makes no attempt to align the claim limitations directed to "adjusting the gas injector to maintain the uniform gas supply" with the teachings of the '330 reference. As discussed above, the claimed uniform gas supply is provided to the surface of a wafer. Not only does the '330 reference fail to teach providing a uniform supply of gas to a wafer surface, the discussion of the allegedly corresponding figure 8 embodiment fails to teach any adjusting of the injector to maintain the uniform supply at the wafer surface. Instead, the '330 reference uses a rotating shaft to obtain uniformity. Thus, the Examiner has failed to show that the '330 reference corresponds to each of the claimed limitations of claim 27, the '330 reference does not teach the requisite correspondence, and the rejection must fail.

A careful review of the rejected claims would reveal that Appellant's invention is directed to treating a wafer surface and not to overcoming gas density issues in a vertical chamber. For example, each of claims 18 and 19 is limited to " ... supplying a uniform supply of gas to the surface of the wafer" for the purpose of "deposit[ing] a coating on the wafer."

[1] The different embodiments involve two different reaction chambers; thus the processing steps performed in each chamber would differ based upon the embodiment's teaching. For example, the chamber of the figure 1 embodiment uses electrodes between the heater and the outer tube whereas the figure 8 embodiment operates without the electrodes and further includes multiple gas supply injectors for multiple inputs.

In view of the lack of correspondence between the teachings of the '330 reference and the claimed invention, Appellant respectfully requests that the Board reverse the subject rejections.

Issue 2: The Section 102(b) rejection of claim groups I and III is improper when the asserted '330 reference fails to correspond to Appellant's claimed structure and function.

The Examiner has failed to show correspondence to Appellant's indirect-gas-supply structure claimed under 35 U.S.C. § 112(6): "injector means for supplying a uniform supply of gas to the surface of the wafer." Paragraph six of 35 U.S.C. § 112 requires that a claim limitation expressed as a means-plus-function shall be construed to cover the corresponding structure described in the specification. In determining patentability, the broadest reasonable interpretation the Examiner may give a means-plus-function claim limitation is that which is statutorily mandated by paragraph six: the structure disclosed in the specification. MPEP § 2182 citing *In re Donaldson Co.,* 16 F3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994). Appellant's indirect-gas-supply structure corresponding to the claimed injector "means" is directed to the structure of an injector positioned in the CVD arrangement so that the outlet or outlets face the reactor tube wall with the reactor tube wall reflecting the gas evenly across the wafer surface. Appellant's specification, page 9, lines 19-23.

The '330 reference has no equivalent structure because no structure disclosed in the '330 reference provides Appellant's claimed function of "supplying a uniform supply of gas to the surface of the wafer." The alleged corresponding structure of the '330 reference includes injector holes directly facing the wafers, as seen, for example, in figures 1, 7 and 8, where arrows indicate that the injector holes are directed toward the wafers. The structure of the '330 reference cannot attempt to achieve Appellant's claimed function with its opposite facing outlet holes and reliance upon a rotating shaft.

Moreover, the Examiner fails to present correspondence in the '330 reference to the claimed function of providing a uniform supply of gas to a wafer surface. The Examiner has not identified any teaching corresponding to the operation of the '330 figure 8 embodiment that would correspond to the claimed function of supplying the gas

evenly to the wafer surface. As addressed above with Issue No. 1, the citation to the figure 8 embodiment describes providing a uniform gas *density* throughout the vertical plane of the reaction chamber but without even addressing the issue of uniform gas density at the surface of the wafer. Column 10, lines 31-32. In contrast, Appellant's invention is directed to a localized uniform supply at a wafer surface, and not merely uniformity throughout the CVD chamber. The figure 8 embodiment fails to teach a uniform gas supply provided at a wafer surface as claimed.

Appellant's means-plus-function limitations of claim 18 are exactly opposite of the structure and associated function of the figure 8 arrangement of the '330 reference. The '330 injector holes do not uniformly disperse the gas on the surface of any wafer. Without a showing of complete correspondence to Appellant's claimed structural and functional limitations, the Section 102(b) rejection cannot stand. Accordingly, Appellant requests that the rejection be overturned.

Issue 3: The Section 102(b) rejection of claim groups I and III is improper when the Examiner fails to identify elements of the asserted '330 reference that would allegedly correspond to Appellant's claim limitations including, *e.g.*, the wafer surface and the specified zone as used in the claim 18 clause, "the surface being in a zone of the CVD arrangement that exhibits a depleted gas supply absent the injector means."

At page 2 of the final Office Action, the Examiner recites limitations of Appellant's claim 18 without any identification of where the '330 reference allegedly corresponds to the limitations, other than a general reference to figure 8. By failing to identify where the '330 reference teaches any of the claimed limitations, and specifically the limitations directed to the process of the individual wafer surfaces ("the surface being in a zone of the CVD arrangement that exhibits a depleted gas supply absent the injector means"), the Examiner effectively ignores Appellant's claimed limitations. These limitations being directed to a wafer surface being in a CVD arrangement zone are substantive limitations that cannot be ignored. Without a showing of correspondence in the prior art, the Section 102(b) rejection cannot stand. Even if the Examiner were to deem such limitations as functional, it is still improper to ignore the claimed limitations because, "functional language in the claims must be given full weight and may not be disregarded in evaluating the patentability of the subject

matter defined employing such functional language." Ex parte Bylund, 217 U.S.P.Q. 492, 498 (Bd. Pat. App. 1981); *see also*, In re Venezia, 530 F.2d 956, 189 U.S.P.Q. 149 (CCPA 1976); and MPEP § 2173.05(g). Correspondence must be shown for each limitation in the claims. The Examiner improperly ignored structural claim limitations and without a complete showing of correspondence to the '330 reference, the Section 102(b) rejection is improper and cannot be maintained.

Issue 4: The Section 103(a) rejection of claim group II is improper when the Examiner fails to present evidence of motivation for the asserted combination of references ('330 reference in view of *Jeng et al.* '073) and fails to present a *prima facie* Section 103(a) rejection.

The Office Action fails to present evidence of motivation in support of the proposed combination of the '073 teachings with the '330 reference. The Examiner did not provide any citations or teachings from the '073 reference to indicate that the '073 references would be combinable with the CVD arrangement of the '330 reference. Recent case law indicates that evidence of motivation must be specifically identified and shown by some objective teaching in the prior art leading to the modification. "Our court has provided [that the] motivation to combine may be found explicitly or implicitly: 1) in the *prior art references* themselves; 2) in the knowledge of those of ordinary skill in the art that certain *references*, or disclosures in those references, are of special interest or importance in the field; or 3) from the nature of the problem to be solved, 'leading inventors to look to *references* relating to possible solutions to that problem.'" *Ruiz v. A.B. Chance Co.*, 234 F.3 654, 57 USPQ2d 1161 (Fed. Cir. 2000). The Office Action fails to identify any such evidence of why one skilled in the art would be led to modify the '330 reference, and does not provide any evidence of factual teachings, suggestions or incentives from the prior art that lead to the proposed modification.

Moreover, the skilled artisan would not be motivated to combine the '073 reference with the '330 reference because the asserted combination would frustrate the purpose of the '330 reference. The MPEP states that when a proposed modification would render the teachings being modified unsatisfactory for their intended purpose, then there is no suggestion or motivation to make the proposed modification under 35 U.S.C. § 103(a). *See,* MPEP § 2143.01; *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) (A § 103

rejection cannot be maintained when the asserted modification undermines the purpose or operation of the main reference.). The embodiment of figure 8 is directed to forming a Si_3N_4 passivation film on the wafers. Modifying the '330 reference to use the gases taught by the claimed invention or to form the claimed films would prevent the formation of the '330 reference's Si_3N_4 passivation film, thereby frustrating the purpose of the figure 8 embodiment. To suggest that one skilled in the art would modify the '330 reference in this manner is untenable and improper. Without a presentation of evidence from the '073 reference, the proposed combination is improper and cannot support a Section 103(a) rejection.

Moreover, with respect to claim 24 in group II, Appellant fails to see where either of the cited references teach or suggest the claimed limitation of the anti-reflective coating being deposited having a k value of refractive index that is between about 0.6 and 0.8. The Examiner admits that the '330 reference fails to teach such limitations. As further acknowledged by the Examiner at page 3 of the final Office Action, the '073 reference teaches depositing an anti-reflective coating (ARC) having a k value between 0.3 and 0.5, which does not overlap with, and thus does not teach or suggest, the claimed k value range. Thus, the Examiner has failed to establish a *prima facie* case of rejection by failing to present evidence of motivation to combine the cited references and failing to show correspondence to each of the claimed limitations. Without these requisite showings, the Section 103(a) rejection cannot stand and Appellant accordingly requests that the rejection be reversed.

<u>Issue 5</u>: The Section 103(a) rejection of claim groups IV-VI is improper when the asserted combination of references ('330 reference in view of *Bartholomew et al.* '080) fails to correspond to each of the claimed limitations.

As discussed above, the '330 reference fails to correspond to each of the claimed limitations of independent claims 18 and 19 (group I). The Office Action at pages 3 and 4 acknowledges that the '330 reference further fails to teach providing a gas concentration detector in the CVD arrangement and adjusting the gas injector in response to a detected concentration (groups IV-VI). In an attempt to overcome these deficiencies, the Examiner proposes combining the '330 teachings with the teachings of the '080 reference to correspond to the limitations of the claims in groups IV-VI. The proposed combinations still fail to teach or suggest each of the limitations of the claimed invention.

With respect to claim groups IV-VI, the Office Action erroneously cites the '080 reference which also fails to teach or suggest adjusting a gas injector (Appellant's claims 27 and 28), does not teach or suggest a gas concentration detector (Appellant's claims 28 and 29), does not teach or suggest removing the gas concentration detector from the CVD arrangement after detecting a concentration (Appellant's claim 29), and does not teach or suggest detecting the concentration of the supplied gas (Appellant's claim 30).

The '080 reference is directed to maintaining a substantially constant exhaust flow rate in various regions (*see, e.g.*, Abstract, col. 2, lines 8-10 and 15-20; col. 5, lines 10-14 ("effluent gas stream"); col. 10, lines 25-27 ("load and unload exhaust gas paths"), lines 35-43; Figures 1, 4 and 5; Claim 1 ("an exhaust flow control system")), whereas the present invention is directed to delivering a uniform supply of gas to a wafer surface in a zone in a CVD arrangement via an injector having spatially well-placed injection holes, rather than simply by controlling a flow rate to be constant (*see, e.g.*, Figs. 1-4 of the instant application). Monitoring and controlling the gas flow exhaust path does not correspond to the claim limitations regarding using an injector to supply gas uniformly to a zone that would otherwise exhibit a depleted gas supply. Therefore, the '080 reference does not address the limitations involving depletion of gas supply in the CVD arrangement as claimed. The Office Action provides no citations or attempted alignment of the '080 reference with the claimed limitations and therefore, the Office Action fails to show the requisite correspondence to support a Section 103(a) rejection and Appellant requests that the rejection be reversed.

With further respect to claim groups IV-VI, Appellant fails to see where the '080 reference teaches or suggests the claimed limitation of detecting the concentration of the supplied gas. Very clearly, the '080 reference teaches making gas measurements in the exhaust gas flow. *See e.g.*, Abstract, col. 2, lines 8-10 and 15-20; col. 5, lines 10-14 ("effluent gas stream"); col. 10, lines 25-27 ("load and unload exhaust gas paths"), lines 35-43; and Claim 1 ("an exhaust flow control system"). Figures 1, 4 and 5 all show the locations of gas flow measurements in these exhaust pathways, consistent with the written description. Monitoring the gas flow exhaust path does not correspond to the claim limitations detecting the concentration of the supplied gas. Therefore, a *prima facie* rejection has not been established, and Appellant requests that the Section 103(a) rejection be reversed.

Specifically regarding claim groups V-VI, Appellant fails to see where the cited references teach or suggest the claimed limitation of removing the at least one gas concentration detector. The Examiner did not cite a particular portion of either reference that teaches this feature. The '080 reference's teaching of delta-pressure transducers across an orifice in the exhaust gas path are not conventionally, or easily made into, removable installations. Nor is there any mention in the reference that these flow monitoring points are removed after being used. Therefore, Appellant submits that a *prima facie* rejection has not been established, and requests that the Section 103(a) rejection be overturned.

Specifically regarding claim group VI, Appellant fails to see where the cited references teach or suggest the claimed limitation of operating the CVD arrangement under simulated processing conditions to detect the concentration of the supplied gas. The Examiner did not cite a particular portion of either reference that teaches this feature. Therefore, Appellant submits that a *prima facie* case of obviousness has not been established and requests that the Section 103(a) rejection be overturned.

If the Examiner is asserting that detection of a depleted gas supply, or any of the other above-mentioned features, is inherently present in the asserted combination, evidence of such inherency argument has not been properly established. To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter *is necessarily present in the thing described in the reference*, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991) (emphasis added). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.* at 1269, 20 U.S.P.Q.2d at 1749 (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981).

In connection with the discussion under Issue No. 1 and the above arguments, neither of the asserted combinations of references teaches each of the limitations of the claimed invention; thus, the Section 103(a) rejections are improper and should be reversed.

IX. Conclusion

In view of the above, Appellant submits that the rejections are improper, the claimed invention is patentable, and that the rejections of claims 18-30 should be reversed. Appellant respectfully requests reversal of the rejections as applied to the appealed claims and allowance of the entire application.

Authority to charge the Assignee's deposit account was provided on the first page of this brief.

Respectfully submitted,

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APPENDIX OF APPEALED CLAIMS (09/575,349)

18. A system for forming a coating on a surface of a semiconductor wafer in a CVD arrangement, the system comprising:

injector means for supplying a uniform supply of gas to the surface of the wafer, the surface being in a zone of the CVD arrangement that exhibits a depleted gas supply absent the injector means; and

means for using the supplied gas in combination with selected reactants to deposit a coating on the wafer.

19. A method for forming a coating on a surface of a semiconductor wafer in a CVD arrangement, the method comprising:

supplying gas to the surface of the wafer using a gas injector adapted to maintain uniform supply of the gas in a zone of the CVD arrangement that would exhibit a depleted gas supply absent the injector; and

using the supplied gas in combination with selected reactants and depositing a coating on the wafer.

20. The method of claim 19, wherein supplying gas to the surface includes supplying gas in different quantities to different zones of the CVD arrangement.

21. The method of claim 20, wherein the different quantities are selected to compensate for a gas depletion rate associated with the selected zone of the CVD arrangement to which the injector supplies gas.

22. The method of claim 19, wherein the gas includes at least one of: ammonia and dichlorosilane.

23. The method of claim 19, wherein depositing a coating on the wafer includes depositing an anti-reflective coating having uniform optical properties.

24. The method of claim 23, wherein the anti-reflective coating is deposited having a k value of refractive index that is between about 0.6 and 0.8.

25. The method of claim 23, further comprising performing photolithography on the wafer using the anti-reflective coating.

26. The method of claim 19, wherein depositing a coating on the wafer includes depositing a coating having uniform thickness.

27. The method of claim 19, further comprising adjusting the gas injector to maintain the uniform gas supply.

28. The method of claim 27, wherein adjusting the gas injector comprises:
providing at least one gas concentration detector in the CVD arrangement;
detecting the concentration of the supplied gas using the detector; and
in response to the detected concentration, adjusting the gas injector.

29. The method of claim 28, prior to depositing a coating on the wafer, further comprising removing the at least one gas concentration detector from the CVD arrangement after detecting the concentration of the supplied gas.

30. The method of claim 29, wherein detecting the concentration of the supplied gas using the detector includes operating the CVD arrangement under simulated processing conditions.